

Sensor-filled virtual home designed to keep disabled families together

Smart Condo project brainchild of U of A professors, students

BY CHELSEA COUPAL, THE EDMONTON JOURNAL JANUARY 27, 2009



Lili Liu, left, and Eleni Stroulia hold a computer showing the virtual room while they are inside the Smart Condo.

Photograph by: Bruce Edwards, the Journal, The Edmonton Journal

Even with asthma and allergies, five-year-old Elizabeth plays and dances and helps with chores. Her father, Gordon, 40, has multiple sclerosis and uses a walker. Joyce, her mother, is a full-time nurse with Type 1 diabetes who is prone to neuropathic foot wounds.

The three live together in a two-bedroom, two-bathroom Edmonton condominium and although the family is imaginary, their home's design is not.

The 800-sq.-ft. mock condominium exists in the University of Alberta's Telus Centre. Created by eight professors and 46 students from industrial design, occupational therapy, pharmacy, and computer science backgrounds, the living space is designed to allow such families to live independently.

For the past 10 years, occupational therapy and industrial design students have collaborated on design projects targeted at senior citizens. In 2007, students learned about designing for the morbidly obese. During the fall 2008 semester, however, students from outside the two faculties were included

on the Smart Condo project.

"For this particular project, we deliberately took the focus away from seniors, and put the focus on a family aging with disabilities," said Lili Liu, an occupational therapy professor involved with the project.

Liu said designing for a family forced the students to consider accommodating individuals at different age levels with progressive conditions.

Although the project targets families, it easily lends itself to independent living for seniors as well. The overall goal of the project is to accommodate as many people as possible.

"We want to keep people living independently and living at home," said Robert Lederer, an industrial design professor. "We want the nursing home to be a last resort, not the first."

Phase 1 of the three-phase project focused on designing a space to accommodate the current and future needs of the family.

In the master bedroom, the closet is near enough to the bed that Gordon can reach items and dress while sitting down.

A locked medication cabinet hangs in Elizabeth's closet, so her parents can easily access her medication.

Both bathrooms have grab bars, benches inside and outside the shower, and enough room for Gordon's walker. Non-slip flooring and rounded countertops are featured throughout the home.

The condo is much more than a collection of safety features. Phase 2 of the project has team members incorporating various motion, vibration, and heat sensors, so health professionals can monitor the family's activities.

"Our observations show people don't like to be monitored by video cameras, but don't mind sensors," Liu said.

"We don't want to be Big Brotherish," said computer science professor Eleni Stroulia. "We want to monitor people in a good way, in a way that they accept."

Besides being less obtrusive than video-monitoring, sensors are less expensive Stroulia said.

Theoretically, the sensors will be attached to a mainframe computer, and messages sent to various health services via the Internet.

The sensors can detect whether someone is sitting, standing, moving around, opening or closing a particular door.

"If someone fell in the shower," Lederer said, "the sensors would pick that up and relay the information, and someone could be sent to help."

Drug intake will also be sensor monitored to ensure patients are taking required doses. Gordon and Joyce's (tentative) automated drug dispenser will record and notify their pharmacy each time a dose is taken, if any doses are missed, and when a prescription requires a refill. To access their drugs, Gordon and Joyce press a button to dispense their required dose, then tear open a plastic package to get them. The packaging is meant to deter Elizabeth from accessing her parents' drugs.

The other part of Phase 2 is Second Life, an online program health professionals will see when monitoring the family. Instead of actual humans, doctors or pharmacists see a 3-D replica of what is happening inside the condo.

Monitoring will happen automatically; condo dwellers will not have to be computer literate to operate the sensors.

However, users will be able to turn off the sensors at any time, or in particular areas if they prefer privacy in the bedroom or bathroom.

In 2011, Edmonton Clinic North at 114th Street and 87th Avenue will open under the guidance of the U of A Health Sciences Council. A fully functional Smart Condo will be built inside, and tests will be run with live subjects.

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